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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,287	02/16/2006	Takahiro Yamada	040302-0548	3475

22428 7590 12/29/2009

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EXAMINER	
BARROW, AMANDA J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
12/29/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,287	YAMADA ET AL.	
	Examiner	Art Unit	
	AMANDA BARROW	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/15/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

1. The Applicant's amendment filed on 8/31/2009 was received. Claims 1-14 were amended.

2. The texts of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on 4/8/2009.

Claim Rejections - 35 USC § 112

3. The claim rejection under 35 U.S.C. 112, first paragraph on claim 10 is withdrawn because the claim has been amended.

Claim Rejections - 35 USC § 103

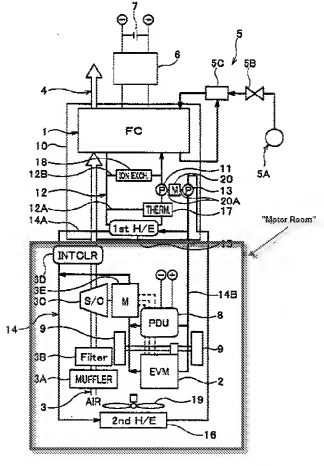
4. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Imaseki et al. on claims 1-4, 10, 11 and 14 are withdrawn as the claims have been amended or cancelled. The rejections on the claims dependent from claims 1-4, 10, 11 and 14 are therefore also withdrawn as independent claim(s) have been amended.

5. Claims 1 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa (US Patent Application 2001/0050191 A1).

Regarding claim 1, Ogawa discloses a cooling system for a fuel cell to be used in a fuel cell powered vehicle (abstract). As illustrated in Figure 1, Ogawa teaches a fuel cell 1, a bypass flow passage 12A ("bypass circuit") and a primary circulating pump 11 ("coolant pump")

(paragraphs 21-28) located in a fuel cell box 10 located below a passenger floor (paragraph 22). Ogawa further discloses an electric vehicle motor 2 ("drive motor") outside of the fuel cell box 10. What is considered to be the "motor room" of Ogawa (as it includes the electric vehicle motor 2 and is not located within the limits of the fuel cell box 10) is shown below:

FIG.1



Ogawa teaches a "fuel cell temperature control apparatus" illustrated in Figure 1 which comprises heat exchanger 15, a primary circulation passage ("coolant circuit") which permits flow of a coolant through the heat exchanger 15 to cool the fuel ell stack (paragraphs 24 and 25); a primary circulating pump 11 ("coolant pump") disposed in the primary circulation passage

("coolant circuit") so as to circulate the coolant and a bypass flow passage 12A ("bypass circuit") mounted below a passenger floor in the fuel cell box 10 wherein the heat exchanger 15 is connected with the fuel cell 1 through the bypass flow passage 12A ("bypass circuit") which is connected to the primary circulation passage (part of the "coolant ciruit") and permits the coolant to bypass the heat exchanger (paragraphs20-28; see Figure 1).

While Ogawa discloses a heat exchanger 15, it is now shown mounted in the motor room; however, the rearrangement of parts, without any new or unexpected results, is an obvious modification of one of ordinary skill in the art. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (see MPEP § 2144.04).

Regarding claim 14, there are multiple instances of claim language invoking a 35 U.S.C. 112, sixth paragraph limitation (see MPEP 2181) due to means-plus-function language. Claim 14 recites, "circulation means for circulating coolant," which is defined in the specification as a coolant circuit (page 3, line 30 and page 4, lines 1-6). Claim 14 recites, "bypass means for bypassing the heat exchanger with respect to the coolant," which is defined in the specification as a bypass circuit (page 4, lines 7-10). Claim 14 recites, "pump means for pumping the coolant," which is defined in the specification as a coolant pump (page 4, lines 10-13).

For the rejection of claim 14, please see the rejection of claim 1 as claim 14 recites the same structure but uses means-plus-function language, thus, the rejection of claims 1 and 14 are the same in this instance.

6. Claims 1-8, 10, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imaseki et al. (US Patent Application 2002/0037447 A1) (hereinafter "Imaseki") in view of Imaseki et al. (US Patent Application 2002/0061426 A1) (hereinafter "Imaseki426") and Ogawa et al. (US Patent Application 2001/0050191 A1).

Regarding claim 1, Imaseki teaches a cooling system for a fuel cell ("fuel cell temperature control apparatus") which is to be used in a vehicle (paragraph 2) comprising a first circulating passage 11 ("a coolant circuit") that circulates and supplies cooling liquid into a fuel cell and also allows the cooling liquid to flow through a heat exchanger 3; a bypass line 11A ("a bypass circuit") that is connected to the first circulating passage 11 permitting the cooling liquid to bypass the heat exchanger 3; and a first circulating pump 12 located in the first circulating passage 11 between the fuel cell and the bypass line 11A allowing coolant to be circulated (paragraph 25; also see Figure 1).

Imaseki does not specifically recite that a coolant pump, bypass circuit and fuel cell are disposed in an underfloor portion of a vehicle, nor does Imaseki disclose a motor room in front of a vehicle with a vehicle drive motor where a heat exchanger is disposed in said motor room; however, Ogawa discloses a similar invention in which the coolant pump, bypass circuit and fuel cell are disposed in an underfloor portion and there is a "motor room" in the front of a vehicle with a vehicle drive motor.

As illustrated in Figure 1, Ogawa teaches a fuel cell 1, a bypass flow passage 12A ("bypass circuit") and a primary circulating pump 11 ("coolant pump") (paragraphs 21-28) located in a fuel cell box 10 located below a passenger floor (paragraph 22). Ogawa further discloses an electric vehicle motor 2 ("drive motor") and a heat exchanger 16 outside of the fuel

cell box 10. What is considered to be the "motor room" of Ogawa (as it includes the electric vehicle motor 2 and is not located within the limits of the fuel cell box 10) was shown above in Figure 1.

Furthermore, Imaseki426 discloses a similar invention in which a fuel cell system can be disposed in a small space such as the under-floor of a vehicle compartment to improve space efficiency (paragraph 2).

Therefore, it would have been obvious to a person of ordinary skill in the art to rearrange the parts of the Imaseki cooling system so that the coolant pump, bypass circuit and fuel are located in an underfloor section because Imaseki426 discloses that this improves space efficiency (paragraph 2).

Regarding claim 2, Imaseki teaches that the cooling system for a fuel cell comprises an ion exchanger 14 for removing ions from the coolant (paragraph 52).

Regarding claim 3, Imaseki teaches that the ion exchanger 14 is connected to the bypass line 11A and therefore located in the "bypass circuit."

Regarding claim 4, Imaseki teaches that the ion exchanger 14 is disposed in a branch circuit branched off from the first circulating passage ("coolant circuit") at a discharge side of the first circulating pump 12 ("coolant pump") and connected to the first circulating passage at an intake side of the first circulating pump (see Figure 1).

Regarding claim 5, Imaseki does not disclose whether or not the ion exchanger 14 ("ion removal filter") is located in the motor room; however, the rearrangement of parts, without any new or unexpected results, is an obvious modification of one of ordinary skill in the art. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (see MPEP § 2144.04).

Regarding claim 6, Imaseki does not teach that the cooling system comprises a coolant reservoir tank; however, Imaseki426 does teach a tank 15 containing coolant disposed in the primary coolant circulating path in the motor room (paragraphs 57-59). Imaseki 2 also teaches that part of the coolant circulating the circulating path is directed to an ion exchanger 103e and delivered to the tank 15 containing coolant (paragraph 112).

It would have been obvious to a person of ordinary skill in the art to combine the tank containing coolant ("coolant reservoir tank") of Imaseki 426 to the cooling system of Imaseki in order to provide a place for extra coolant to be held. A rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art (see MPEP §§ 2143 and 2143.02).

Regarding claim 7, Imaseki fails to teach an air heat exchanger; however, Ogawa teaches a secondary heat exchanger 16 which is an air cooling type having an electric cooling fan 19 which circulates through the secondary circulation passage 14 with air flow created during traveling of the vehicle. The secondary heat exchanger 16 is disposed in the secondary circulation passage 14 ("the coolant circuit downstream of the bypass circuit"). This allows for heat exchange to be performed with the air to be supplied to the fuel cell (paragraphs 24-28).

It would have been obvious to a person of ordinary skill in the art to combine the air heat exchanger of Ogawa to the cooling system of Imaseki in order to provide cooled air to the fuel cell allowing for a more efficient and productive fuel cell system.

Regarding claim 8, Imaseki 2 teaches a humidifier 102a ("hydrogen heat exchanger") disposed in the coolant circuit upstream from the bypass circuit that is supplied with coolant to humidify the fuel gas supplied to the fuel cell by the high-pressure hydrogen source (paragraphs 102-112; also see Figures 1 and 5). Although the humidifier 102a is not labeled as a "heat exchanger," it performs the same function as a heat exchanger by being provided with coolant in order to cool the hydrogen gas being supplied to the fuel cell.

Regarding claim 10, Imaseki teaches that the heat exchanger 3 includes a radiator 23 allowing the coolant to be cooled by the moving air of the vehicle (paragraphs 41 and 42; also see Figure 1).

Regarding claim 11, Imaseki fails to disclose an intermediate heat exchanger; however, Ogawa teaches a secondary heat exchanger 16 ("intermediate heat exchanger") disposed between the radiator and the fuel cell (paragraphs 6 and 24-28).

It would have been obvious to a person of ordinary skill in the art to combine the secondary heat exchanger of Ogawa to the cooling system of Imaseki in order to provide a more efficient means to cool the fuel cell while using minimal coolant. Furthermore, the mere rearrangement of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (see MPEP § 2144.04).

Regarding claim 14, there are multiple instances of claim language invoking a 35 U.S.C. 112, sixth paragraph limitation (see MPEP 2181) due to means-plus-function language. Claim 14 recites, "circulation means for circulating coolant," which is defined in the specification as a coolant circuit (page 3, line 30 and page 4, lines 1-6). Claim 14 recites, "bypass means for

bypassing the heat exchanger with respect to the coolant," which is defined in the specification as a bypass circuit (page 4, lines 7-10). Claim 14 recites, "pump means for pumping the coolant," which is defined in the specification as a coolant pump (page 4, lines 10-13).

Regarding claim 14, Imaseki teaches a cooling system for a fuel cell ("fuel cell temperature control apparatus") which is to be used in a vehicle (paragraph 2) comprising a first circulating passage 11 ("a coolant circuit") that circulates and supplies cooling liquid into a fuel cell and also allows the cooling liquid to flow through a heat exchanger 3; a bypass line 11A ("a bypass circuit") that is connected to the first circulating passage 11 permitting the cooling liquid to bypass the heat exchanger 3; and a first circulating pump 12 located in the first circulating passage 11 between the fuel cell and the bypass line 11A allowing coolant to be circulated (paragraph 25; also see Figure 1).

Imaseki does not specifically recite that a coolant pump, bypass circuit and fuel cell are disposed in an underfloor portion of a vehicle, nor does Imaseki disclose a motor room in front of a vehicle with a vehicle drive motor where a heat exchanger is disposed in said motor room; however, Ogawa discloses a similar invention in which the coolant pump, bypass circuit and fuel cell are disposed in an underfloor portion and there is a "motor room" in the front of a vehicle with a vehicle drive motor.

As illustrated in Figure 1, Ogawa teaches a fuel cell 1, a bypass flow passage 12A ("bypass circuit") and a primary circulating pump 11 ("coolant pump") (paragraphs 21-28) located in a fuel cell box 10 located below a passenger floor (paragraph 22). Ogawa further discloses an electric vehicle motor 2 ("drive motor") and a heat exchanger 16 outside of the fuel cell box 10. What is considered to be the "motor room" of Ogawa (as it includes the electric

vehicle motor 2 and is not located within the limits of the fuel cell box 10) was shown above in Figure 1.

Furthermore, Imaseki426 discloses a similar invention in which a fuel cell system can be disposed in a small space such as the under-floor of a vehicle compartment to improve space efficiency (paragraph 2).

Therefore, it would have been obvious to a person of ordinary skill in the art to rearrange the parts of the Imaseki cooling system so that the coolant pump, bypass circuit and fuel are located in an underfloor section because Imaseki426 discloses that this improves space efficiency (paragraph 2).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imaseki, Imaseki426 and Ogawa as applied to claims 1-8, 10, 11 and 14 above, and further in view of Micheli et al. (US Patent 5,449,568) (hereinafter "Micheli").

Regarding claim 9, Imaseki fails to teach a combustor heat exchanger in the cooling system, however Micheli does teach this apparatus. As is illustrated in Figure 1, an indirect heat exchanger 22 ("combustor heat exchanger") is in a circuit with a combustor 50 which combusts the exhaust hydrogen from the fuel cell 14 (columns 5-8).

It would have been obvious to a person of ordinary skill in the art to adapt the indirect heat exchanger of Micheli to the cooling system of Imaseki in order to make use of the heat produced from the exhaust providing for a more efficient system (Micheli, column 1, lines 6-60). The heat from the exhaust can also be used to provide a faster warm-up of the fuel cell as shown in Figure 1 as the exhaust is re-directed toward the fuel cell 14. Thus, it would also have been

obvious to a person of ordinary skill in the art to adapt the indirect heat exchanger of Micheli to the cooling system of Imaseki because Micheli discloses that the heat can provide a faster warm-up of hte fuel cell (see Figure 1).

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imaseki, Imaseki426 and Ogawa as applied to claims 1-8, 10, 11 and 14 above, and further in view of Shioya (US Patent Application 2002/0081468 A1).

Regarding claim 12, Imaseki fails to teach that the fuel cell is detachable, however, Shioya teaches that when a fuel cell is applied as the power supply system, that it can be readily removed from the device (paragraph 42). Shioya teaches that the fuel cell is configured to be attached or detached without restraint (paragraph 572).

It would be obvious to a person of ordinary skill in the art to adapt the arrangement of Shioya to the cooling system of Imaseki in order to easily remove the fuel cell for maintenance or if its life has expired thereby suppressing the cost (Shioya, paragraph 42).

Regarding claim 13, Shioya does not recite that a bypass circuit and coolant pump are mounted in the "accommodating member" or detachable portion; however, if one adapts the arrangement of Shioya to the cooling system of Imaseki as discussed in the rejection of claim 12, it would be obvious to a person of ordinary skill in the art to include the bypass circuit and coolant pump due to their proximity as this would yield predictable results. Also, making an old device portable is an obvious design. *In re Lindberg*, 93 USPQ 23 (CCPA 1952) (See MPEP § 2144.04).

Response to Arguments

9. Applicant's arguments filed on 8/31/09 with respect to the claims under 103(a) are moot due to the amendments made.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMANDA BARROW whose telephone number is (571)270-7867. The examiner can normally be reached on 7:30am-5pm EST. Monday-Friday, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AMANDA BARROW/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795